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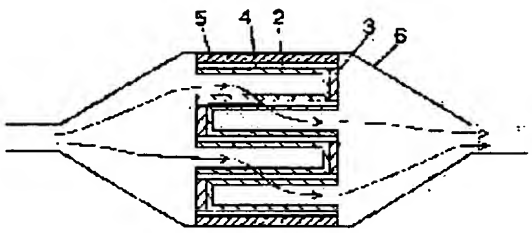
(54) WASTE GAS CLEANING MATERIAL AND WASTE GAS CLEANING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a waste gas cleaning material and a waste gas cleaning device improved in the reaction efficiency of a waste gas with a catalyst and the collecting efficiency to enable to efficiently combusting particulates.

SOLUTION: The waste gas cleaning material 1 is constituted so as to alternately seal one of a gas inlet side and a gas outlet side of each adjacent air permeable cell of a wall through type filter 2 composed of a combined body of the air permeable cells, which are partitioned by a gas permeable partition, and is formed by applying a waste gas cleaning catalyst 4 having a main crystal structure of CuV2O6 (c), in which the molar ratio (a:b) of copper element (a) to vanadium element (b) is 1:1.5 to 1:3.5 and the molar ratio (c:d) of a copper vanadium compound (c) to cesium sulfate (d) is 1:3 to 1:3.5, on the inside surface of the air permeable cells.



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* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] It comes by turns to ****** one side by the side of the gas inlet of the aeration cel which the Wall through mold filter which consists of the aggregate of the aeration cel divided with the gas permeability septum each adjoins, or a gas outlet. The mole ratio (a:b) of the copper element (a) whose main crystal structure is CuV 2O6, and a vanadium element (b) The copper vanadium compound of 1:1.5 to 1:3.5 (c), Emission-gas-purification material characterized by for the mole ratio (c:d) with cesium sulfate (d) having covered the emission-gas-purification catalyst which is 1:3 to 1:3.5 to the internal surface of said aeration cel, and forming it.
[Claim 2] Emission-gas-purification material according to claim 1 to which the gas permeability septum of said Wall through mold filter is cordierite, and the volume of the pore of 0.2 or more cc/g and 10 micrometers or more of apertures is characterized by for an average pole diameter being 8-20 micrometers, and porosity being 40 - 60% by total pore volume 40 to 60% to total pore volume.
[Claim 3] The gas permeability septum of said Wall through mold filter is the aluminum titanate obtained by extrusion molding. 8-42 micrometers and porosity 29-63 micrometers, [the average pole diameter] Emission-gas-purification material according to claim 1 to which coefficient-of-thermal-expansion alphaa of the direction of a knockout is characterized by coefficient-of-thermal-expansion alphab of a direction perpendicular to -one to 0x10 to 6 degree C -2.3x10-6 degree C -1 and the extrusion direction being 0x10 to 6 -one to 2.4x10 to 6 degree C degree C -1.
[Claim 4] Emission-gas-purification material according to claim 1 characterized by for the gas permeability septum of said Wall through mold filter being silicon carbide, for an average pole diameter being 6-15 micrometers, and porosity being 42 - 53%.
[Claim 5] The exhaust gas purge characterized by having arranged emission-gas-purification material given in claim 1 thru/or any 1 term of 4 to the upstream of emission, and having arranged the emission-gas-purification honeycomb object which made noble metals support to the downstream of emission.
[Claim 6] The exhaust gas purge according to claim 5 characterized by for said emission-gas-purification honeycomb object coating the honeycomb object of the quality of cordierite, or the quality of aluminum titanate with the noble-metals emission-gas-purification catalyst which makes it come at least among Pt, Pd, and Rh to support more than a kind on the alumina which coated silica alumina, and constituting it.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the emission-gas-purification material and exhaust gas purge which burn and purify the particulate (a solid-state-like carbon particle, a liquid, or the solid-state-like amount hydrocarbon particle of macromolecules) contained in the exhaust gas discharged from a diesel power plant.
[0002]
[Description of the Prior Art] Since, as for the particulate contained in exhaust gas from a diesel power plant, the particle diameter also contains the cancerating substance by being easy to float in atmospheric air by about 1 micrometer or less, it becomes the problem that the effect on the body is big, and the particulate effluent control of a diesel power plant is being tightened up.
[0003] After carrying out uptake of the particulate with the emission-gas-purification object which consists of the heat-resistant structure as one of the approaches which removes the particulate from exhaust gas, an emission-gas-purification object is heated with heating means, such as a burner and a heater, a particulate is burned and there is the approach of changing and emitting to carbon dioxide gas. Moreover, as emission-gas-purification material, the catalyst for emission gas purification which becomes the above-mentioned emission-gas-purification object from a metallic oxide etc. can be supported, and the particulate by which uptake was carried out in this case can be burned more at low temperature compared with the time of there being no catalyst by the catalysis of the catalyst for emission gas purification.
[0004] If a particulate can be burned at exhaust gas temperature using the emission-gas-purification material which supported such a catalyst for emission gas purification, it is not necessary to arrange a heating means in an exhaust gas purge, and the configuration of an exhaust gas purge can be simplified.
[0005] However, it is difficult to fully burn a particulate at exhaust gas temperature also about the emission-gas-purification material which supported the catalyst for emission gas purification with the present condition, and concomitant use with a heating means is indispensable. Therefore, development of the catalyst for emission gas purification which has the high catalytic activity which can burn a particulate at low temperature more is desired.
[0006] It is known that the thing using metallic oxides, such as Cu and V, as a catalyst for emission gas purification has comparatively high activity until now. For example, the catalyst for emission gas purification which becomes JP,58-143840,A (it is hereafter called an I number official report for short.) from the compound metallic oxide containing Cu and V is indicated. Moreover, the catalyst for emission gas purification which added alkali metal to metallic oxides, such as Cu, V, and Mo, is indicated by JP,58-174236,A (it is hereafter called a RO number official report for short.). Moreover, the catalyst for emission gas purification which added the oxide and noble metals of alkali metal to metallic oxides, such as Cu, Mn, and Mo, is indicated by the JP,4-42063,B official report (it is hereafter called the Ha number official report for short.).
[0007]
[Problem(s) to be Solved by the Invention] However, the emission-gas-purification material which made the I number official report, the RO number official report, and the Ha number official report support the catalyst for emission gas purification of a publication Since it does not have the structure which the exhaust gas and the catalyst for emission gas purification which are supplied are contacted efficiently, and carries out uptake It passed, while the catalytic activity of this catalyst for emission gas purification was not fully able to be harnessed and the particulate in exhaust gas had not been caught, and there was a trouble that the rate of emission gas purification was low.

[0008] Furthermore, since it did not have the organization condition that the emission-gas-purification material which an emission-gas-purification catalyst and this support maintained exhaust gas and a good contact condition, and made catalytic reaction cause efficiently, there was a trouble that the particulate by which uptake was carried out to emission-gas-purification material could not fully be burned at exhaust gas temperature.
[0009] This invention solves the above-mentioned conventional technical problem, and it aims at offering the emission-gas-purification material which the reaction effectiveness and collection efficiency of exhaust gas and a catalyst can be raised [material], and can burn a particulate efficiently, and an exhaust gas purge.
[0010]
[Means for Solving the Problem] The emission-gas-purification material of this invention comes by turns to ****** one side by the side of the gas inlet of the aeration cel which the Wall through mold filter which consists of the aggregate of the aeration cel divided with the gas permeability septum each adjoins, or a gas outlet. The mole ratio (a:b) of the copper element (a) whose main crystal structure is CuV 2O6, and a vanadium element (b) The copper vanadium compound of 1:1.5 to 1:3.5 (c), A mole ratio (c:d) with cesium sulfate (d) covers the emission-gas-purification catalyst which is 1:3 to 1:3.5 to the internal surface of said aeration cel, and is formed.
[0011] The emission-gas-purification material which the reaction effectiveness and collection efficiency of exhaust gas and a catalyst can be raised [material], and can burn a particulate efficiently by this, and an exhaust gas purge can be offered.
[0012]
[Embodiment of the Invention] Emission-gas-purification material according to claim 1 comes by turns to ****** one side by the side of the gas inlet of the aeration cel which the Wall through mold filter which consists of the aggregate of the aeration cel divided with the gas permeability septum each adjoins, or a gas outlet. The mole ratio (a:b) of the copper element (a) whose main crystal structure is CuV 2O6, and a vanadium element (b) The copper vanadium compound of 1:1.5 to 1:3.5 (c), A mole ratio (c:d) with cesium sulfate (d) covers the emission-gas-purification catalyst which is 1:3 to 1:3.5 to the internal surface of said aeration cel, and is formed.
[0013] The following operations are acquired by this.
[0014] (a) By turns, by that of **** suggestion ********, one side by the side of the gas inlet of the aeration cel which a Wall through mold filter each adjoins, or a gas outlet can pass the gas permeability septum by which the exhaust gas supplied to emission-gas-purification material was covered with the emission-gas-purification catalyst, can contact exhaust gas and an emission-gas-purification catalyst certainly, and can burn efficiently the particulate by which it was caught in exhaust gas.
[0015] (b) An emission-gas-purification catalyst can raise emission-gas-purification effectiveness, using effectively the outstanding catalytic activity by a main crystal structure making the copper which can take two or more different oxidization conditions since the copper vanadium compound and cesium sulfate of a specific quantitative ratio are contained by the specific quantitative ratio by CuV 2O6, and vanadium intermingled.
[0016] (c) Since cesium sulfate is added by the emission-gas-purification catalyst, the sintered compact reinforcement of the emission-gas-purification catalyst which calcinates the mixture containing a copper vanadium compound and is formed can be raised, and durability can be raised.
[0017] (d) It is possible to be able to operate cesium sulfate as a catalyst to which the sulfide component in exhaust gas is made to oxidize or return, and to raise an exhaust gas cleaning effect further in this case.
[0018] (e) Since the mole ratio of a copper vanadium compound and cesium sulfate is limited to the specific range which can demonstrate both catalytic activity most in multiplication, the solid-state-like carbon particle in a particulate can be burned effectively.
[0019] (f) Since a main crystal structure is CuV 2O6, a copper element and a vanadium element are maintainable to stability in the specific range operated most efficiently as a combustion catalyst.
[0020] Here, for example, exhaust gas supply lay length has the shape of the shape of a cylinder about 120-250mm and whose diameter are 100-250mm, and a rectangular parallelepiped, and Wall through mold filters gather many aeration cels in the shaft orientations of the cylinder, or the die-length direction of a rectangular parallelepiped, and consist of conditions. This aeration cel has a square passage cross section, and it is 100-250 per 2.54cm square, and the number of arrangement of an aeration cel can pass exhaust gas in this aeration cel, and can be passed towards an outlet side from the entrance side of that aeration cel.
[0021] Extrusion molding of the Wall through mold filter can be carried out to a configuration with many aeration cels, or it can supply the plasticity raw material which added the binder to metal mold, can make a

mold able to slush and harden the slurry which distributed the raw material, and can be fabricated. Ceramic ingredients, such as an alumina and alumina-silica, a zirconia, a titania, a magnesia, aluminum titanate, cordierite, a mullite, silicon carbide, boron carbide, silicon nitride, alumimium nitride, and sialon, can be used for the quality of the material of this Wall through mold filter. Organization conditions, such as a pole diameter and a distribution condition, are adjusted so that the septum part of this aeration cel, i.e., the body section of a Wall through mold filter, may have the gas permeability which can make the exhaust gas supplied penetrate.

[0022] The closure of exhaust gas ******** of each aeration cel which adjoins mutually [this Wall through mold filter], or one side of an outlet side is filled up with and carried out with mixture with minerals powder which consists of an alumina, a silica, magnesias, or these multiple oxide component objects, such as a crystalline substance and glassiness, an organic binder, or an inorganic binder. By this, the septum of the permeability of each aeration cel which constitutes a Wall through mold filter can be made to be able to penetrate the exhaust gas supplied, an emission way can be formed, the catalyst on an aeration cel can be made to be able to contact, and catalytic reaction can be caused efficiently.

[0023] It can also use in the state of the multiple oxide which could use Cu5V2O10, CuV2O6, and Cu3V2O8, or mixed two or more sorts out of these as a copper vanadium compound, for example.

[0024] An emission-gas-purification catalyst is a catalyst bed which formed the layer of the mixture containing a copper vanadium compound and cesium sulfate in the wall surface in the aeration cel of a Wall through mold filter, was made to calcinate at predetermined temperature as occasion demands, and was formed and whose thickness is a number - 10 micrometers of numbers, for example.

[0025] If the mole ratio of a copper vanadium compound and cesium sulfate is smaller than 1:3, in order that the amount of cesium sulfate may increase and cesium sulfate may cover a copper vanadium compound, it becomes impossible for the amount which can contact soot among the copper and vanadium used as a main catalyst to be insufficient, and to demonstrate a substantial catalyst function. Moreover, if this weight ratio becomes larger than 1:3.5, since the amount of cesium sulfate is insufficient and it becomes impossible to fully demonstrate the catalytic activity by the synergistic effect, it is not desirable.

[0026] Total pore volume is constituted so that the gas permeability septum of said Wall through mold filter may be cordierite in claim 1, 40 - 60% and an average pole diameter may be 8-20 micrometers and the volume of the pore of 0.2 or more cc/g and 10 micrometers or more of apertures may be [the porosity of emission-gas-purification material according to claim 2] 40 - 60% to total pore volume.

[0027] The following operations besides an operation of claim 1 are acquired by this.

[0028] (a) As cordierite with little thermal-expansion change by the gas permeability ingredient, since the conditions of a penetrable organization are set up, the pressure loss at the time of supplying exhaust gas to emission-gas-purification material can be controlled, the particulate in exhaust gas can be caught efficiently, the catalyst which the gas passageway was made to support can be made to be able to act, and a particulate can be burned efficiently.

[0029] (b) Since the coefficient of thermal expansion can be made low using cordierite, it can control that make small the differential thermal expansion to produce also to the severe temperature fluctuation at the time of using it, equipping in the manifold of an automobile, and a crack, exfoliation, etc. arise, and it can be made into the emission-gas-purification material excellent in the durability over a long period of time.

[0030] (c) The contact nature of the solid-state-like carbon particle in the particulate in the case of purification and a catalyst is rationalized, and it can purify, without accumulating a particulate into emission-gas-purification material.

[0031] If there is less total pore volume in cordierite in 0.2cc /here than g, gas permeability will be insufficient and it will become the factor which it becomes [factor] easy to deposit a particulate and reduces a catalyst function into a filter. Moreover, it becomes difficult to secure the gas permeability which needs 8 micrometers and porosity as a gas filter when 40% and an average pole diameter have respectively the volume of the pore of 10 micrometers or more of apertures smaller than 40% to total pore volume. Conversely, since the evil of the reinforcement as the structure which needs it as a gas filter when the volume of the pore of 10 micrometers or more of apertures has [60% and an average pole diameter] respectively 20 micrometers and porosity larger than 60% to total pore volume falling becomes strong, it is not desirable.

[0032] Emission-gas-purification material according to claim 3 is aluminum titanate from which the gas permeability septum of said Wall through mold filter is obtained by extrusion molding in claim 1. 8-42 micrometers and porosity 29-63 micrometers, [the average pole diameter] Coefficient-of-thermal-expansion alphaa of the direction of a knockout is constituted so that coefficient-of-thermal-expansion

alphab of a direction perpendicular to -one to 0x10 to 6 degree C -2.3x10-6 degree C -1 and the extrusion direction may be 0x10 to 6 -one to 2.4x10 to 6 degree C degree C -1.
[0033] The following operations besides an operation of claim 1 are acquired by this.
[0034] (a) Since the body of a Wall through mold filter consists of aluminum titanates with a small coefficient of thermal expansion and the coefficient of thermal expansion of the specific direction, an average pole diameter, and porosity are moreover set as the predetermined range, the emission-gas-purification material excellent in thermal shock resistance and gas permeability can be offered.
[0035] (b) While purifying without rationalizing the contact nature of the solid-state-like carbon particle in the particulate in the case of purification, and a catalyst, and accumulating a particulate into emission-gas-purification material, the thermal resistance of emission-gas-purification material improves, and it has the operation which prevents the crack and erosion at the time of being particulate purification.
[0036] Here, if 8 micrometers and porosity have respectively an average pole diameter smaller than 29%, it will become difficult to secure sufficient gas permeability. Conversely, since it will become the factor in which a mechanical strength is insufficient for and durability deteriorates if 42 micrometers and porosity have respectively an average pole diameter larger than 63%, it is not desirable.
[0037] Coefficient-of-thermal-expansion alphaa of the direction of a knockout is smaller than -2.3x10-6 degree C -1, and since it may act on the condition of coefficient-of-thermal-expansion alphab of a direction perpendicular to the extrusion direction carrying out in the temperature fluctuation case in being smaller than 0, and being [crack] easy to generate the thermal expansion of both directions, it is not desirable. Moreover, coefficient-of-thermal-expansion alphaa of the extrusion direction is larger than 0, and since the same inclination appears also when coefficient-of-thermal-expansion alphab of a direction perpendicular to the extrusion direction becomes larger than 2.4x10 to 6 degree C -1, it is not desirable.
[0038] In claim 1, the gas permeability septum of said Wall through mold filter is silicon carbide, and emission-gas-purification material according to claim 4 is constituted so that an average pole diameter may be 6-15 micrometers and porosity may be 42 - 53%.
[0039] The following operations besides an operation of claim 1 are acquired by this.
[0040] (a) Even if silicon carbide is made into a long duration elevated temperature, with high temperature conductivity, since it is strong also to temperature fluctuation, it prevents the crack and erosion in the case of particulate purification, and can improve thermal resistance by [so that creep deformation may not be caused].
[0041] (b) The coat of SiO2 with which silicon carbide comes to oxidize is made to intervene, and the reaction of the emission-gas-purification catalyst and the body of the filter made from Wall through mold silicon carbide which consist of a copper vanadium compound and cesium sulfate can be prevented.
[0042] Here, if 6 micrometers and porosity have respectively the average pole diameter of silicon carbide smaller than 42%, it will become difficult to secure sufficient gas permeability. Conversely, since it will become the factor in which a mechanical strength is insufficient for and durability deteriorates if 15 micrometers and porosity have respectively an average pole diameter larger than 53%, it is not desirable.
[0043] An exhaust gas purge according to claim 5 arranges emission-gas-purification material given in claim 1 thru/or any 1 term of 4 to the upstream of emission, arranges the emission-gas-purification honeycomb object which made noble metals support to the downstream of emission, and is constituted.
[0044] The following operations are acquired by this.
[0045] (a) By dissociating independently, respectively and establishing continuously the emission-gas-purification material and emission-gas-purification honeycomb object with which the catalyst property of a catalyst and the property of an emission way which are supported differ from each other, in the emission-gas-purification material of the upstream, the soot in the particulate in exhaust gas is caught certainly, and is burned, and the emission-gas-purification honeycomb object of the downstream can remove injurious ingredients which are the particulate remainder efficiently, such as SOF, and a carbon monoxide, a hydrocarbon.
[0046] (b) Since the exhaust gas honeycomb object containing noble metals is prepared in the downstream, while noble metals and a particulate contact the exhaust gas removed beforehand to noble metals and can use the activity of a precious metal catalyst effectively, when noble metals contact a particulate, it can prevent that a catalyst property deteriorates. By this, the initial complement of noble metals can be lessened and an exhaust gas purge can be manufactured at low cost.
[0047] (c) Since the emission-gas-purification object containing the oxide of transition metals and the emission-gas-purification honeycomb object containing noble metals are separated and established, change of the catalyst presentation by association with the oxide of transition metals and noble metals etc. can be

prevented, and each durability is raised.
[0048] Here, as an emission-gas-purification honeycomb object, although a flow through type ceramic honeycomb, a Wall through type ceramic honeycomb, a flow through type metal honeycomb, etc. are mentioned, a ceramic honeycomb is used suitably. As the quality of the material of a ceramic honeycomb, cordierite, aluminum titanate, a mullite, alpha-alumina, a zirconia, a titania, silicon carbide, etc. are mentioned.
[0049] These ingredients have a thing better than the exhaust gas temperature (about 350-450 degrees C) at the time of applying to a diesel power plant at least with the thermal resistance which bears high temperature.
[0050] As noble metals, heat-resistant temperature, such as platinum, a rhodium, and palladium, is highly excellent in catalytic activity, and the metal which is moreover hard to corrode is used suitably.
[0051] It is the catalyst support which the particle front face of the powder which consists of an inorganic oxide which consists of these heat-resistant composites, such as a high silica, an alumina, a zirconia, and a titania, was made to distribute noble metals, and was formed in it, and the catalyst bed which made the noble metals of an emission-gas-purification honeycomb object support makes these powder or Plastic solids sinter at predetermined temperature, or using inorganic adhesive etc., it is fixed in the shape of a layer, and is formed.
[0052] The noble metals used for an emission-gas-purification honeycomb object have the carbon monoxide which is a coexistence component in the exhaust gas which was not able to emission-gas-purification-material-catch the upstream, and the operation which purifies SOF which is the particulate remainder in a hydrocarbon list.
[0053] In claim 5, said emission-gas-purification honeycomb object coats the honeycomb object of the quality of cordierite, or the quality of aluminum titanate with the noble-metals emission-gas-purification catalyst which makes it come at least among Pt, Pd, and Rh to support more than a kind on the alumina which coated silica alumina, and the exhaust gas purge according to claim 6 is constituted.
[0054] The following operations besides an operation of claim 5 are acquired by this.
[0055] (a) Since an emission-gas-purification honeycomb object consists of the small quality of cordierite or the quality of aluminum titanate of coefficient of thermal expansion, it has the destructive resistance which was excellent to the thermal shock, and the durability can be raised.
[0056] (b) Since the precious metal catalyst is made to support on the alumina which coated silica alumina, a precious metal catalyst, an alumina particle, and compatibility can be raised, it can prevent that a precious metal catalyst exfoliates from an alumina particle, and durability can be raised further.
[0057] (c) A reaction with SO2 can be controlled according to an operation of silica alumina.
[0058] Below, it explains, referring to a drawing about the gestalt of operation of this invention.
[0059] (Gestalt 1 of operation) Drawing 1 is the sectional view of the emission-gas-purification material of the gestalt 1 of operation of this invention.
[0060] The Wall through mold filter constituted in drawing 1 by 1 having the emission-gas-purification material of the gestalt 1 of operation, and 2 having many aeration cels, It ******. 3 -- the entrance side or outlet side of each aeration cel of the Wall through mold filter 2 -- alternation -- ****** -- eye the bottom -- The emission-gas-purification catalyst by which 4 is formed in the internal surface of an aeration cel in the shape of a layer, and 5 are the heat insulators of the shape of bulk which consists of a nature ingredient of an inorganic fiber inserted between the containers 6 of the exhaust gas purge with which it is equipped with the emission-gas-purification material 1.
[0061] The emission-gas-purification material 1 consists of a Wall through mold filter 2 which consists of a nature ingredient of cordierite which carried out the seal seal of the edge of an aeration cel by ******** 3 by turns, and an emission-gas-purification catalyst 4 covered by the front face of the aeration cel. The Wall through mold filter 2 which ******(ed) one end by turns and constituted the aeration way of exhaust gas makes the frame of the emission-gas-purification material 1, and has the operation to which 0.2 or more cc/g and the pore volume of 10 micrometers or more make it burn effectively, without making the particulate in exhaust gas deposit in FAIRUTA when 40 - 60% and an average pole diameter are [8-20 micrometers and porosity] 40 - 60%, and the total pore volume purifies exhaust gas.
[0062] When less than 40% and an average pole diameter are [less than 8 micrometers and porosity] less than 40% for 0.2 or less cc/g and the pore volume of 10 micrometers or more, total pore volume here It is easy to deposit a particulate in a filter. **** pore volume by 0.2 or more cc/g Even if there is more pore volume of 10 micrometers or more than 60%, an average pole diameter is larger than 20 micrometers and porosity is larger than 40%, the particulate which passes a filter on the contrary increases, it cannot burn and

a particulate cannot fully be purified.
[0063] (Gestalt 2 of operation) Drawing 2 is the sectional view of the exhaust gas purge of the gestalt 2 of operation of this invention.
[0064] In drawing 2 , the emission-gas-purification honeycomb object with which 20 is prepared in the exhaust gas purge of the gestalt 2 of operation, and 21 is prepared in the downstream of the emission-gas-purification material 1 in the container 6 of the exhaust gas purge 20, and 22 are precious metal catalysts covered by the inside of the emission way of the emission-gas-purification honeycomb object 21. In addition, about what has the same function as the gestalt 1 of said operation, the same sign is attached and the explanation is omitted.
[0065] The exhaust gas purge 20 of the gestalt 2 of operation forms the gas passageway which closes one end of an aeration cel by ******** 3 by turns, and passes along the septum of gas permeability, arranges the Wall through mold filter 2 of the quality of cordierite which covered the septum side with the emission-gas-purification catalyst 4 to the upstream of emission, arranges the emission-gas-purification honeycomb object 21 with the precious metal catalyst 22 covered by the emission way front face to the downstream of emission, and is constituted. The Wall through mold filter 2 arranged at the upstream makes the frame of a catalyst filter, and the total pore volume has the operation purified without making SOOT (soot) mainly deposit in FAIRUTA also in the particulate in exhaust gas, when 40 - 60% and an average pole diameter are [8-20 micrometers and porosity] 40 - 60% for the pore volume of 0.2cc [g] /or more and 10 micrometers or more. When less than 40% and an average pole diameter are [less than 8 micrometers and porosity] less than 40% for 0.2 or less cc/g and the pore volume of 10 micrometers or more, total pore volume It is easy to deposit a particulate in a filter. **** pore volume by 0.2 or more cc/g Even if there is more pore volume of 10 micrometers or more than 60%, an average pole diameter is larger than 20 micrometers and porosity is larger than 40%, the particulate which passes a filter on the contrary increases, and a particulate cannot fully be purified. The emission-gas-purification honeycomb object 21 of the catalyst filter arranged at the downstream makes the frame of a catalyst filter, and has a particulate in exhaust gas, and the operation which a carbon monoxide and a hydrocarbon are oxidized in a SOF part list, and purifies them in it especially.
[0066] (Gestalt 3 of operation) The emission-gas-purification material of the gestalt 3 of operation is ** which changed the quality of the material of the Wall through mold filter 2 of the gestalt 1 of operation to the nature ingredient of aluminum titanate from the nature ingredient of cordierite, and the arrangement configuration is the same as that of the case of drawing 1 .
[0067] The emission-gas-purification material 1 of the gestalt 3 of operation consists of a filter made from Wall through mold aluminum titanate which ******(ed) one end by turns, and an emission-gas-purification catalyst 4 covered by this filter front face made from aluminum titanate. The filter made from Wall through mold aluminum titanate which ******(ed) one end by turns makes the frame of a catalyst, and its thermal resistance of emission-gas-purification material improves while purifying it, without rationalizing the contact nature of the particulate in the case of purification, and a catalyst, and accumulating a particulate into emission-gas-purification material, when the average pole diameter is 8-42 micrometers and porosity is 29 - 63%, and it has the operation which prevents the crack and erosion at the time of being particulate purification. When an average pole diameter is less than 8 micrometers and porosity is less than 29%, it is easy to deposit a particulate in a filter, and even if an average pole diameter is conversely larger than 42 micrometers and porosity is larger than 63%, the particulate which passes a filter on the contrary increases, and a particulate cannot fully be purified.
[0068] (Gestalt 4 of operation) The exhaust gas purge of the gestalt 4 of operation is what changed the quality of the material of the Wall through mold filter 2 of the gestalt 2 of operation to the nature ingredient of aluminum titanate from the nature ingredient of cordierite, and the arrangement configuration is the same as that of what was shown in drawing 2 .
[0069] The exhaust gas purge 20 of the gestalt 4 of operation consists of an emission-gas-purification filter which becomes the downstream of emission from a honeycomb object and the catalyst bed covered on this honeycomb body surface about the emission-gas-purification filter which consists of a filter made from Wall through mold aluminum titanate which ******(ed) one end by turns to the upstream of an exhaust gas style, and a catalyst bed covered by this filter front face made from aluminum titanate. The filter made from Wall through mold aluminum titanate which ******(ed) one end by turns [of the catalyst filter arranged at the upstream] is what makes the frame of a catalyst filter. When the average pole diameter is 8-42 micrometers and porosity is 29 - 63%, while purifying without rationalizing the contact nature of the particulate in the case of emission gas purification, and a catalyst, and accumulating a particulate into emission-gas-

purification material The thermal resistance of emission-gas-purification material improves, and it has the operation which prevents the crack and erosion at the time of being particulate purification. When an average pole diameter is less than 8 micrometers and porosity is less than 29%, it is easy to deposit a particulate in a filter, and even if an average pole diameter is conversely larger than 42 micrometers and porosity is larger than 63%, the particulate which passes a filter on the contrary increases, and a particulate cannot fully be purified. The honeycomb object of the catalyst filter arranged at the downstream makes the frame of a catalyst filter, and has a particulate in exhaust gas, and the operation which purifies a carbon monoxide and a hydrocarbon in a SOF part list especially.

[0070] (Gestalt 5 of operation) The emission-gas-purification material of the gestalt 5 of operation changes the quality of the material of the Wall through mold filter 2 of the gestalt 1 of operation to the nature ingredient of silicon carbide from the nature ingredient of cordierite.

[0071] The emission-gas-purification material 1 of the gestalt 5 of operation consists of a filter made from Wall through mold silicon carbide which ******(ed) one end by turns, and a layer of the emission-gas-purification catalyst 4 covered by this filter front face made from silicon carbide. The filter made from Wall through mold silicon carbide When the average pole diameter is 6-15 micrometers and porosity is 42 - 53%, while purifying without rationalizing the contact nature of the particulate in the case of purification, and a catalyst, and accumulating a particulate into emission-gas-purification material While the thermal resistance of emission-gas-purification material improves and preventing the crack and erosion at the time of being particulate purification It has the operation which prevents the reaction of the emission-gas-purification catalyst and the filter made from Wall through mold silicon carbide which consist of a copper vanadium compound and cesium sulfate by SiO2 which exists in the front face of the filter made from Wall through mold silicon carbide. When an average pole diameter is less than 6 micrometers and porosity is less than 42%, it is easy to deposit a particulate in a filter, and even if an average pole diameter is conversely larger than 10 micrometers and porosity is larger than 53%, the particulate which passes a filter on the contrary increases, and a particulate cannot fully be purified.

[0072] (Gestalt 6 of operation) The exhaust gas purge of the gestalt 6 of operation changes the quality of the material of the Wall through mold filter 2 of the gestalt 2 of operation to the quality of silicon carbide from the quality of cordierite.

[0073] The exhaust gas purge 20 of the gestalt 6 of operation consists of an emission-gas-purification filter which becomes the downstream of emission from a honeycomb object and the catalyst bed covered on this honeycomb body surface about the emission-gas-purification filter which consists of a filter made from Wall through mold silicon carbide which ******(ed) one end by turns to the upstream of emission, and a catalyst bed covered by this filter front face made from silicon carbide. The filter made from Wall through mold silicon carbide which ******(ed) one end by turns [of the catalyst filter arranged at the upstream] is what makes the frame of a catalyst filter. When the average pole diameter is 6-15 micrometers and porosity is 42 - 53%, while purifying without rationalizing the contact nature of the particulate in the case of purification, and a catalyst, and accumulating a particulate into emission-gas-purification material The thermal resistance of emission-gas-purification material improves. By SiO2 which exists in the front face of the filter made from Wall through mold silicon carbide while preventing the crack and erosion in the case of particulate purification It has the operation which prevents the reaction of the emission-gas-purification catalyst and the filter made from Wall through mold silicon carbide which consist of a copper vanadium compound and cesium sulfate. When an average pole diameter is less than 6 micrometers and porosity is less than 42%, it is easy to deposit a particulate in a filter, and even if an average pole diameter is conversely larger than 10 micrometers and porosity is larger than 53%, the particulate which passes a filter on the contrary increases, and a particulate cannot fully be purified. The honeycomb object of the catalyst filter arranged at the downstream makes the frame of a catalyst filter, and has a particulate in exhaust gas, and the operation which purifies a carbon monoxide and a hydrocarbon in a SOF part list especially.

[0074]

[Example] Next, the example which materialized the gestalt of operation of this invention further is explained.

[0075] Respectively Copper-sulfate 5 hydrate (239.4g, 489g, and 705.6g) (Nakarai Tesuku make), (Example 1) In the solution which melted oxidization vanadium sulfate (product made from the Wako Pure Chem industry), and cesium sulfate (SOEKAWA CHEMICAL make) to 2000g purified water An average pole diameter 45% 13 micrometers, [total pore volume] [0.2 cc/g and the pore volume of 10 micrometers or more] After the number of cels 48% and per inch sinks in the filter made from Wall through mold cordierite which ******(ed) one end by turns which is 100 pieces and removes an excessive solution by the Ayr blow,

it dries and calcinates, and porosity obtains an emission-gas-purification filter. A heat insulator is twisted around this emission-gas-purification filter, and emission-gas-purification material is obtained by fixing to a predetermined container.

[0076] (Example 2) The production approach of the emission-gas-purification filter first installed in the upstream of emission is explained. Respectively Copper-sulfate 5 hydrate (239.4g, 489g, and 705.6g) (Nakarai Tesuku make), In the solution which melted oxidization vanadium sulfate (product made from the Wako Pure Chem industry), and cesium sulfate (SOEKAWA CHEMICAL make) to 2000g purified water An average pole diameter 45% 13 micrometers, [total pore volume] [0.2 cc/g and the pore volume of 10 micrometers or more] After the number of cels 48% and per inch sinks in the filter made from Wall through mold cordierite which ******(ed) one end by turns which is 100 pieces and removes an excessive solution by the Ayr blow, it dries and calcinates, and porosity obtains an emission-gas-purification filter. Next, if the production approach of the emission-gas-purification filter installed in the downstream of emission is explained, a 375g aluminium nitrate (product made from the Wako Pure Chem industry) will be added to purified water 5L, 1400g (Sumitomo Chemical make) of activated aluminas will be added after churning and into said solution, and it will agitate one whole day and night. Next, 90g of sodium silicates and 99.5g of sodium hydroxides are added, and the precursor of silica alumina is deposited on an activated-alumina front face. Said solution is fully dried after washing and it calcinates in air. Next, 1400g of activated aluminas which covered said silica alumina is added to the mixed solution which added 720g (Kao make) of dispersants to pure-water 2.5L, 20hr mixing is carried out, and a slurry is produced. This slurry is diluted so that fine-particles concentration may be set to one third with the same solution as said mixed solution, and after an air blow removes a slurry excessive after being immersed and pulling up the diameter of 5.66 inches, die length of 6 inches, and the honeycomb structure object made from cordierite of cel number 400 cel / square inch in this dilution slurry, it dries at 300 degrees C. After repeating this activity several times and carrying out the coat of the specified quantity, it calcinates in air. Subsequently, after an air blow removes a solution excessive after being immersed and pulling up said honeycomb structure object in the liquid which added the palladium nitrate of the specified quantity, and the citric acid to pure-water 5L, it calcinates in air after desiccation with a freeze drying method. After an air blow removes a solution excessive after being immersed and pulling up the honeycomb structure object which supported said palladium to pure-water 5L finally in the dinitro diamino platinum nitric-acid solution of the specified quantity, and the liquid which dissolved the citric acid, an emission-gas-purification filter is obtained by calcinating in reducing atmosphere after desiccation with a freeze drying method.

[0077] A heat insulator is twisted around this each emission-gas-purification filter, and emission-gas-purification material is obtained by fixing to the predetermined location of a predetermined container.

[0078] (Example 3) The average pole diameter of the filter which supports an emission-gas-purification catalyst is the same as that of an example 1 except being the filter made from Wall through mold aluminum titanate which ******(ed) one end by turns whose coefficient-of-thermal-expansion alphaa of a direction perpendicular to -2.3x10-6-0 degree-C-1 and the extrusion direction coefficient-of-thermal-expansion alphaa of 50% and the extrusion direction is zero to 2.4x10 to 6 degree C -1 for 15 micrometers and porosity.

[0079] (Example 4) The average pole diameter of the filter which supports the emission-gas-purification catalyst arranged to the upstream of emission is the same as that of an example 2 except being the filter made from Wall through mold aluminum titanate which ******(ed) one end by turns whose coefficient-of-thermal-expansion alphaa of a direction perpendicular to -2.3x10-6-0 degree-C-1 and the extrusion direction coefficient-of-thermal-expansion alphaa of 50% and the extrusion direction is zero to 2.4x10 to 6 degree C -1 for 15 micrometers and porosity.

[0080] (Example 5) The average pole diameter of the filter which supports an emission-gas-purification catalyst is the same as that of an example 1 except being the filter made from Wall through mold silicon carbide which ******(ed) one end by turns 9 micrometers and whose porosity are 47%.

[0081] (Example 6) The average pole diameter of the filter which supports the emission-gas-purification catalyst arranged to the upstream of emission is the same as that of an example 2 except being the filter made from Wall through mold silicon carbide which ******(ed) one end by turns 9 micrometers and whose porosity are 47%.

[0082] Respectively Copper-sulfate 5 hydrate (239.4g, 489g, and 705.6g) (Nakarai Tesuku make), (Example A1) In the solution which melted oxidization vanadium sulfate (product made from the Wako Pure Chem industry), and cesium sulfate (SOEKAWA CHEMICAL make) to 2000g purified water Out of range out of range [total pore volume is smaller than 0.2 cc/g, and the pore volume of 10 micrometers or more out of range is 40 - 60%], out of range [an average pole diameter out of range is 8-20 micrometers], and porosity

are 40 - 60% -- After it sinks in the filter made from Wall through mold cordierite which ******(ed) one end by turns whose number of cels per inch is 100 pieces and the Ayr blow removes an excessive solution, it dries and calcinates and an emission-gas-purification filter is obtained. The heat insulator was twisted around this emission-gas-purification filter, and emission-gas-purification material was obtained by fixing to a predetermined container.

[0083] (Example A2) If the production approach of the emission-gas-purification filter first installed in the upstream of emission is explained Respectively Copper-sulfate 5 hydrate (239.4g, 489g, and 705.6g) (Nakarai Tesuku make), In the solution which melted oxidization vanadium sulfate (product made from the Wako Pure Chem industry), and cesium sulfate (SOEKAWA CHEMICAL make) to 2000g purified water Out of range out of range [total pore volume is smaller than 0.2 cc/g, and the pore volume of 10 micrometers or more out of range is 40 - 60%], out of range [an average pole diameter out of range is 8-20 micrometers], and porosity are 40 - 60% -- After it sank in the filter made from Wall through mold cordierite which ******(ed) one end by turns whose number of cels per inch is 100 pieces and the Ayr blow removed the excessive solution, it dried and calcinated and the emission-gas-purification filter was obtained.

[0084] Next, the production approach of the emission-gas-purification honeycomb object installed in the downstream of emission is explained. A 375g aluminium nitrate (product made from the Wako Pure Chem industry) is added to purified water 5L, 1400g (Sumitomo Chemical make) of activated aluminas is added after churning and into said solution, and it agitates one whole day and night. Next, 90g of sodium silicates and 99.5g of sodium hydroxides are added, and the precursor of silica alumina is deposited on an activated-alumina front face. Said solution is fully dried after washing and it calcinates in air. Next, 1400g of activated aluminas which covered said silica alumina is added to the mixed solution which added 720g (Kao make) of dispersants to pure-water 2.5L, 20hr mixing is carried out, and a slurry is produced.

[0085] This slurry is diluted so that fine-particles concentration may be set to one third with the same solution as said mixed solution, and after an air blow removes a slurry excessive after being immersed and pulling up the diameter of 5.66 inches, die length of 6 inches, and the honeycomb structure object made from cordierite of cel number 400 cel / square inch in this dilution slurry, it dries at 300 degrees C.

[0086] After repeating this activity several times and carrying out the coat of the specified quantity, it calcinates in air. Subsequently, after an air blow removes a solution excessive after being immersed and pulling up said honeycomb structure object in the liquid which added the palladium nitrate of the specified quantity, and the citric acid to pure-water 5L, it calcinates in air after desiccation with a freeze drying method.

[0087] After an air blow removes a solution excessive after being immersed and pulling up the honeycomb structure object which made said palladium support to pure-water 5L finally in the dinitro diamino platinum nitric-acid solution of the specified quantity, and the liquid which dissolved the citric acid, an emission-gas-purification honeycomb object is acquired by calcinating in reducing atmosphere after desiccation with a freeze drying method.

[0088] The heat insulator was twisted around this each emission-gas-purification material and an emission-gas-purification honeycomb object, and the exhaust gas purge consisted of fixing to the predetermined location of a predetermined container.

[0089] Out of range [the filter which supports an emission-gas-purification catalyst is / an average pole diameter out of range / 8-42 micrometers], (Example A3) Coefficient-of-thermal-expansion alphaa of the out of range and the extrusion direction whose porosity is 29 - 63% Out of range [of -2.3x10-6-0 degree-C-1], Except being the filter made from Wall through mold aluminum titanate with which coefficient-of-thermal-expansion alphaa of a direction perpendicular to the direction of a knockout ******(ed) one end by turns [of zero to 2.4x10 to 6 degree C -1 / out of range], it is the same as that of an example 1.

[0090] (Example A4) The filter which supports the emission-gas-purification catalyst arranged to the upstream of emission Out of range [an average pole diameter out of range is 8-42 micrometers], out of range [porosity out of range is 29 - 63%], Coefficient-of-thermal-expansion alphaa of the direction of a knockout Out of range [of -2.3x10-6-0 degree-C-1], Except being the filter made from Wall through mold aluminum titanate with which coefficient-of-thermal-expansion alphaa of a direction perpendicular to the direction of a knockout ******(ed) one end by turns [of zero to 2.4x10 to 6 degree C -1 / out of range], it is the same as that of an example 2.

[0091] (Example A5) It is the same as that of an example 1 except being the filter made from Wall through mold silicon carbide with which the filter which supports an emission-gas-purification catalyst ******(ed) one end out of range [an average pole diameter out of range is 6-15 micrometers], and by turns [out of

range] whose porosity is 42 - 53%.
[0092] (Example A6) It is the same as that of an example 2 except being the filter made from Wall through mold silicon carbide with which the filter which supports the emission-gas-purification catalyst arranged to the upstream of emission ******(ed) one end out of range [an average pole diameter out of range is 6-15 micrometers], and by turns [out of range] whose porosity is 42 - 53%.
[0093] : (Evaluation experiment 1) It set in the fixed-bed flow system reactor, after putting activated carbon at homogeneity on up to the filter produced by test aforementioned (example 1) - (example 6) and (example A1) - (example A6) which evaluate catalytic activity. as reactant gas -- oxygen and a sulfur dioxide -- predetermined concentration content -- carrying out (balance gas = nitrogen) -- making it circulate, the combustion situation of activated carbon was pursued using CO/CO2 sensor, carrying out the temperature up of the temperature from a room temperature to 500 degrees C, and temperature when activated carbon burns 5% compared the catalyst engine performance (activity: unit **). Moreover, as a durability test, after performing predetermined time heat-treatment at 500 degrees C, the same test method estimated the catalyst engine performance the above.
[0094] In addition, Table 1 - (Table 3) is shown together with the result of the evaluation experiment 2 which asked for the rate of leak which shows the result of the evaluation experiment 1 when using cordierite, aluminum titanate, and silicon carbide for a material henceforth, respectively.
[0095]
[Table 1]

	全細孔容積 (cc/g)	10μm以上の細孔容積の割合(%)	平均最高径 (μm)	気孔率 (%)	実験1 初期活性 (℃)	実験1 500℃−10時間処理後の活性 (℃)	実験1 500℃−100時間後の活性 (℃)	実験2 パティキュレートのリーク率 (%)
実施例A 1−1	0. 1	45	13	48	450	450	475	1
実施例 1−1	0. 2	45	13	48	400	405	420	10
実施例 1−2	0. 5	45	13	48	405	407	419	12
実施例A 1−2	0. 2	35	13	48	420	425	460	1
実施例 1−3	0. 2	40	13	48	403	405	415	12
実施例 1−4	0. 2	60	13	48	398	404	420	13
実施例A 1−3	0. 2	64	13	48	435	440	460	20
実施例A 1−4	0. 2	45	6	48	445	450	470	2
実施例 1−6	0. 2	45	8	48	410	410	420	8
実施例 1−7	0. 2	45	20	48	420	420	430	12
実施例A 1−5	0. 2	45	24	48	460	460	480	23
実施例A 1−6	0. 2	45	13	26	453	460	475	1
実施例 1−8	0. 2	45	13	40	405	405	420	12
実施例 1−9	0. 2	45	13	60	410	415	425	12
実施例A 1−7	0. 2	45	13	66	450	460	480	21

[0096]
[Table 2]

	平均細孔径 (μm)	気孔率 (%)	αa (×10⁻⁶/℃)	αa (×10⁻⁶/℃)	実験1 初期活性 (℃)	実験1 500℃−10時間処理後の活性 (℃)	実験1 500℃−100時間処理後の活性 (℃)	実験2 パティキュレートのリーク率 (%)
実施例A 2−1	6	50	−1.1	1.2	460	465	465	1
実施例 2−1	8	50	−1.1	1.2	410	415	420	11
実施例 2−2	15	50	−1.1	1.2	410	410	415	10
実施例 2−3	42	50	−1.1	1.2	405	410	415	12
実施例A 2−2	50	50	−1.1	1.2	450	450	460	25
実施例A 2−3	15	25	−1.1	1.2	455	460	465	30
実施例 2−4	15	29	−1.1	1.2	415	415	420	11
実施例 2−5	15	63	−1.1	1.2	420	420	425	12
実施例A 2−4	15	70	−1.1	1.2	450	455	455	35
実施例A 2−5	15	50	−2.8	1.2	470	480	490	13
実施例 2−6	15	50	−2.3	1.2	415	415	420	12
実施例 2−7	15	50	0	1.2	410	415	415	13
実施例A 2−6	15	50	0.8	1.2	465	470	480	11
実施例A 2−7	15	50	−1.1	−1	475	475	480	12
実施例 2−8	15	50	−1.1	0	405	415	420	11
実施例 2−9	15	50	−1.1	2.4	410	420	420	12
実施例A 2−8	15	50	−1.1	3	460	470	480	13

[0097]
[Table 3]

	平均細孔径 (μm)	気孔率 (%)	実験I 初期活性 (℃)	実験I 500℃−10時間処理後の活性 (℃)	実験I 500℃−100時間処理後の活性 (℃)	実験1 パティキュレートのリーク率 (%)
実施例A 3−1	4	47	455	455	460	2
実施例 3−1	6	47	405	405	410	8
実施例 3−2	9	47	400	405	405	9
実施例 3−3	15	47	405	410	410	9
実施例A 3−2	19	47	470	470	470	20
実施例A 3−3	9	39	460	465	465	1
実施例 3−4	9	42	410	410	410	10
実施例 3−6	9	53	410	415	415	11
実施例A 3−4	9	55	475	475	480	28

[0098] : (Evaluation experiment 2) The test piece with a diameter [of 70mm] x thickness of 1mm was cut

down from the filter produced by trial (example 1) - (example 6) and (example A1) - (example A6) which ask for the rate of leak, and this was fixed to the electrode holder. the electrode holder was installed in the back-wash side of 3400 cc of engine displacements, and the micro dilution tunnel isolated preparatively from piping of the diesel power plant of a 4-cylinder, it asked for the rate of leak by the differential pressure before and behind an electrode holder, and this result was shown in (Table 2).

[0099] The emission-gas-purification material with the emission-gas-purification catalyst shown in an example 1 and the example 2 is understood that the particulate rate of leak with a particulate good combustion cleaning effect is low compared with what is shown in an example A1 and an example A2 so that more clearly than the result shown above (Table 1).

[0100] Namely, the emission-gas-purification material of an example 1 and an example 2 The mole ratio of a copper element and a vanadium element is 1:1.5 to 1:3.5. The main crystal structure by CuV 2O6 And it has the emission-gas-purification catalyst whose ratio of the copper vanadium compound the abundance ratio of whose is more than 25mol%, and cesium sulfate is 1:3 to 1:3.5. 40 - 60% and an average pole diameter make the filter made from Wall through mold cordierite with which 0.2 or more cc/g and the pore volume of 10 micrometers or more ******(ed) one end by turns 8-20 micrometers and whose porosity total pore volume is 40 - 60% about the emission-gas-purification catalyst support.

[0101] On the other hand, the emission-gas-purification material of an example A1 and an example A2 The mole ratio of a copper element and a vanadium element is 1:1.5 to 1:3.5. The main crystal structure by CuV 2O6 And it has the emission-gas-purification catalyst for which the ratio of the copper vanadium compound the abundance ratio of whose is more than 25mol%, and cesium sulfate has the property of 1:3 to 1:3.5. The filter made from Wall through mold cordierite which ******(ed) one end out of range [total pore volume is smaller than 0.2 cc/g, and the pore volume of 10 micrometers or more out of range is 40 - 60%], out of range [an average pole diameter out of range is 8-20 micrometers], and by turns [out of range] whose porosity is 40 - 60% is made to support.

[0102] While the particulate cleaning effect of the emission-gas-purification material with the emission-gas-purification catalyst shown in an example 3 and the example 4 was good and its rate of leak was low compared with what is shown in example A3 and example A4 so that more clearly than the result shown in (Table 2), the thermal resistance of emission-gas-purification material improved, and it turned out that the crack and erosion at the time of being particulate purification can be prevented.

[0103] The emission-gas-purification material shown in these examples 3 and 4 The mole ratio of a copper element and a vanadium element is 1:1.5 to 1:3.5. The main crystal structure by CuV 2O6 And the ratio of the copper vanadium compound the abundance ratio of whose is more than 25mol%, and cesium sulfate has the emission-gas-purification catalyst of 1:3 to 1:3.5. 8-42 micrometers and porosity 29 - 63%, [the average pole diameter] Coefficient-of-thermal-expansion alphaa of the direction of a knockout is supported and formed in the filter made from Wall through mold aluminum titanate which ******(ed) one end by turns whose coefficient-of-thermal-expansion alphaa of a direction perpendicular to -2.3x10-6-0 degree-C-1 and the extrusion direction is zero to 2.4x10 to 6 degree C -1.

[0104] On the other hand, the emission-gas-purification material of example A3 and example A4 The mole ratio of a copper element and a vanadium element is 1:1.5 to 1:3.5. The main crystal structure by CuV 2O6 And it has the emission-gas-purification catalyst whose ratio of the copper vanadium compound the abundance ratio of whose is more than 25mol%, and cesium sulfate is 1:3 to 1:3.5. Out of range [an average pole diameter out of range is 8-42 micrometers about the emission-gas-purification catalyst], out of range [porosity out of range is 29 - 63%], Coefficient-of-thermal-expansion alphaa of the direction of a knockout Out of range [of -2.3x10-6-0 degree-C-1], Coefficient-of-thermal-expansion alphaa of a direction perpendicular to the direction of a knockout is supported and formed in the filter made from Wall through mold aluminum titanate which ******(ed) one end by turns [of zero to 2.4x10 to 6 degree C -1 / out of range].

[0105] The emission-gas-purification material with the emission-gas-purification catalyst shown in an example 5 and the example 6 so that more clearly than the result shown in (Table 3) compared with what is shown in example A5 and an example A6, a particulate cleaning effect is good and the rate of leak is low -- both The thermal resistance of emission-gas-purification material improves, and the crack and erosion at the time of being particulate purification can be prevented. It turned out that the operation which prevents the reaction of the emission-gas-purification catalyst and the filter made from Wall through mold silicon carbide which consist of a copper vanadium compound and cesium sulfate by SiO2 which furthermore exists in the front face of the filter made from Wall through mold silicon carbide is good.

[0106] The mole ratio of a copper element and a vanadium element is 1:1.5 to 1:3.5, and that main crystal

structure of the emission-gas-purification material shown in these examples 5 and 6 is CuV 2O6. And it has the emission-gas-purification catalyst whose ratio of the copper vanadium compound the abundance ratio of whose is more than 25mol%, and cesium sulfate is 1:3 to 1:3.5. It is supported and formed in the filter made from Wall through mold silicon carbide which ******(ed) one end by turns [whose porosity is 42 - 53% about the emission-gas-purification catalyst] whose an average pole diameter is 6-15 micrometers.
[0107] Moreover, the emission-gas-purification material shown in example A5 and the example A6 The mole ratio of a copper element and a vanadium element is 1:1.5 to 1:3.5. The main crystal structure by CuV 2O6 And it has the emission-gas-purification catalyst whose ratio of the copper vanadium compound the abundance ratio of whose is more than 25mol%, and cesium sulfate is 1:3 to 1:3.5. The filter made from Wall through mold silicon carbide which ******(ed) one end out of range [an average pole diameter out of range is 6-15 micrometers about the emission-gas-purification catalyst], and by turns [out of range] whose porosity is 42 - 53% is made to support, and it forms.
[0108]
[Effect of the Invention] According to invention according to claim 1, the following effectiveness is acquired by this.
[0109] (a) By turns, by that of **** suggestion ********, one side by the side of the gas inlet of the aeration cel which a Wall through mold filter each adjoins, or a gas outlet can pass the gas permeability septum by which the exhaust gas supplied to emission-gas-purification material was covered with the emission-gas-purification catalyst, can contact exhaust gas and an emission-gas-purification catalyst certainly, and can burn efficiently the particulate by which it was caught in exhaust gas.
[0110] (b) An emission-gas-purification catalyst can raise emission-gas-purification effectiveness, using effectively the outstanding catalytic activity by a main crystal structure making the copper which can take two or more different oxidization conditions since the copper vanadium compound and cesium sulfate of a specific quantitative ratio are contained by the specific quantitative ratio by CuV 2O6, and vanadium intermingled.
[0111] (c) Since cesium sulfate is added by the emission-gas-purification catalyst, the sintered compact reinforcement of the emission-gas-purification catalyst which calcinates the mixture containing a copper vanadium compound and is formed can be raised, and durability can be raised.
[0112] (d) ** is possible for being able to operate cesium sulfate as a catalyst to which the sulfide component in exhaust gas is made to oxidize or return, and raising an exhaust gas cleaning effect further in this case.
[0113] (e) Since the mole ratio of a copper vanadium compound and cesium sulfate is limited to the specific range which can demonstrate both catalytic activity most in multiplication, the solid-state-like carbon particle in a particulate can be burned effectively.
[0114] (f) Since a main crystal structure is CuV 2O6, a copper element and a vanadium element are maintainable to stability in the specific range operated most efficiently as a combustion catalyst.
[0115] According to invention according to claim 2, the following effectiveness besides the effectiveness of claim 1 is acquired by this.
[0116] (a) As cordierite with little thermal-expansion change by the gas permeability ingredient, since the conditions of a penetrable organization are set up, the pressure loss at the time of supplying exhaust gas to emission-gas-purification material can be controlled, the particulate in exhaust gas can be caught efficiently, the catalyst which the gas passageway was made to support can be made to be able to act, and a particulate can be burned efficiently.
[0117] (b) Since the coefficient of thermal expansion can be made low using cordierite, it can control that make small the differential thermal expansion to produce also to the severe temperature fluctuation at the time of using it, equipping in the manifold of an automobile, and a crack, exfoliation, etc. arise, and it can be made into the emission-gas-purification material excellent in the durability over a long period of time.
[0118] (c) The contact nature of the solid-state-like carbon particle in the particulate in the case of purification and a catalyst is rationalized, and it can purify, without accumulating a particulate into emission-gas-purification material.
[0119] According to invention according to claim 3, the following effectiveness besides the effectiveness of claim 1 is acquired by this.
[0120] (a) Since the body of a Wall through mold filter consists of aluminum titanates with a small coefficient of thermal expansion and the coefficient of thermal expansion of the specific direction, an average pole diameter, and porosity are moreover set as the predetermined range, the emission-gas-purification material excellent in thermal shock resistance and gas permeability can be offered.

[0121] (b) While purifying without rationalizing the contact nature of the solid-state-like carbon particle in the particulate in the case of purification, and a catalyst, and accumulating a particulate into emission-gas-purification material, the thermal resistance of emission-gas-purification material improves, and it has the operation which prevents the crack and erosion at the time of being particulate purification.
[0122] According to invention according to claim 4, the following effectiveness besides the effectiveness of claim 1 is acquired by this.
[0123] (a) Even if silicon carbide is made into a long duration elevated temperature, with high temperature conductivity, since it is strong also to temperature fluctuation, it prevents the crack and erosion in the case of particulate purification, and can improve thermal resistance by [so that creep deformation may not be caused].
[0124] (b) The coat of SiO2 with which silicon carbide comes to oxidize is made to intervene, and the reaction of the emission-gas-purification catalyst and the body of the filter made from Wall through mold silicon carbide which consist of a copper vanadium compound and cesium sulfate can be prevented.
[0125] According to invention according to claim 5, the following effectiveness is acquired by this.
[0126] (a) By dissociating independently, respectively and establishing continuously the emission-gas-purification material and emission-gas-purification honeycomb object with which the catalyst property of a catalyst and the property of an emission way which are supported differ from each other, in the emission-gas-purification material of the upstream, the soot in the particulate in exhaust gas is caught certainly, and is burned, and the emission-gas-purification honeycomb object of the downstream can remove injurious ingredients which are the particulate remainder efficiently, such as SOF, and a carbon monoxide, a hydrocarbon.
[0127] (b) Since the exhaust gas honeycomb object containing noble metals is prepared in the downstream, while noble metals and a particulate contact the exhaust gas removed beforehand to noble metals and can use the activity of a precious metal catalyst effectively, when noble metals contact a particulate, it can prevent that a catalyst property deteriorates. By this, the initial complement of noble metals can be lessened and an exhaust gas purge can be manufactured at low cost.
[0128] (c) Since the emission-gas-purification object containing the oxide of transition metals and the emission-gas-purification honeycomb object containing noble metals are separated and established, change of the catalyst presentation by association with the oxide of transition metals and noble metals etc. can be prevented, and each durability is raised.
[0129] According to invention according to claim 6, the following effectiveness besides the effectiveness of claim 5 is acquired by this.
[0130] (a) Since an emission-gas-purification honeycomb object consists of the small quality of cordierite or the quality of aluminum titanate of coefficient of thermal expansion, it has the destructive resistance which was excellent to the thermal shock, and the durability can be raised.
[0131] (b) Since the precious metal catalyst is made to support on the alumina which coated silica alumina, a precious metal catalyst, an alumina particle, and compatibility can be raised, it can prevent that a precious metal catalyst exfoliates from an alumina particle, and durability can be raised further.
[0132] (c) A reaction with SO2 can be controlled according to an operation of silica alumina.

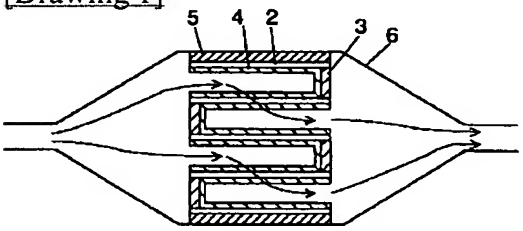
[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

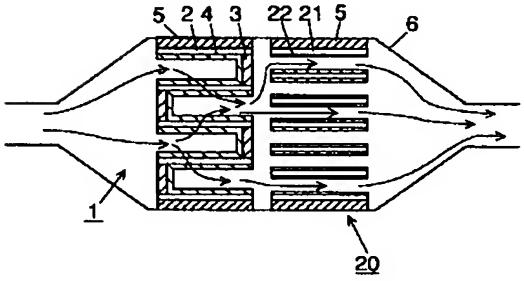
DRAWINGS

[Drawing 1]



[Drawing 2]

1 排ガス浄化材
2 ウォールスルー型フィルター
3 目封じ部
4 排ガス浄化触媒
5 断熱材
6 容器
20 排ガス浄化装置
21 排ガス浄化ハニカム体
22 貴金属触媒



[Translation done.]